

DRAFT Locks/Ship Canal/Lake Union - Tier I - Initial Habitat Project List

Locks/Ship Canal/Lake Union Reaches

Notes on Rankings:

- ☐ Water temperature and quality are recognized as the primary threats to Chinook in this subarea. Projects that address these threats receive higher ratings as a result.
- ☐ There are many potential vegetation restoration projects throughout the subarea at the various street ends and other similar small sites. These projects are individually very small and therefore receive Low rankings for benefits. These projects are better evaluated cumulatively for the entire subarea, where many such projects could produce larger benefits.

Basinwide Recommendations:

Project #	Description
M601	Explore opportunities for shoreline/riparian vegetation opportunities (But be careful not to create overwater and inwater structures that could form bass habitat).
M602	Work with shoreline businesses, shipyards, marinas, and property owners to reduce water pollution (shoreline "steward" person).
M603	Improve monitoring and enforcements of existing water quality regulations. This does not necessarily have to be through a threatening presence, but could be through outreach/education. ECOSS in the Duwamish could serve as an example
M604	Develop and/or advertise BMPs for houseboats and liveaboards. Also assess the extent/impact of heat-pump water temperature alterations.
M605	Reduce the number of toxic pilings in the subarea and encourage the use of non-toxic pilings (steel and concrete). Also reduce use of treated material in docks and other overwater structures.

Ship Canal Locks:**Restoration**

Project #	Reach #	Reach Restor. Benefit Rank	NTAA #	NTAA Name & Description	Approx. Cost	Notes, Key Uncertainties	Benefits to Chinook H, M, L	Feasib. H, M, L
M201	L	not ranked	1a	Further reduce lockage speed for large locks to reduce smolt entrainment in filling culverts.		Lock speed has already been reduced from "fast" to "medium". Previous test indicated that "fast" speeds resulted in significant smolt entrainment. There was not a significant difference in entrainment between medium and low speeds, but it is presumed that low speeds would be better for smolts. May be less of a concern now due to annual removal of barnacles and new strobe lights, if they are repaired to function properly. Current gates incapable of accomplishing "slow" fill speeds, but gates are due for replacement, and new gates could accomplish slow speeds without additional cost. There is some concern that shifting to a slow fill may be upsetting to some users of the large lock, as the time to fill would increase substantially. In addition, low fill volumes used during low water conditions seems to reduce entrainment. Slow fill and strobe lights should be operated in tandem to achieve maximum benefits.	M	H
M202	L	not ranked	1b	Fish Ladder Improvements: Improve downstream entrance to the fish ladder with a telescoping weir and a horizontal gate. Close the slot on the downstream end to concentrate the flow.		Fish ladder is quite old, and there is some evidence that the hydraulic conditions at the end of the ladder are not ideal for fish. Despite this, there is not much evidence that fish are unable to find the ladder. Uncertainty exists as to whether any additional time required to find/use the ladder may contribute to additional mortality. There has also been a proposal to trap and transport adult Chinook to Lake Washington. Others feel that this option should be avoided until other options have been explored.	L	H/M
M203	L	not ranked	1c	Add fishway lighting for the ladder.		Meeting participants were unsure why this would be done, or what the benefit could be. Perhaps this could improve fish use of the ladder at night? This may be related to the questionable perception that the ladder is a slow point for fish, which may be affecting mortality.	?	?

M204	L	not ranked	new	Add/Replace strobe lights to locks to deter smolts and prevent entrainment.		Strobe lights have demonstrated a clear reduction in entrainment in experimental tests, but a durable operating system is not in place as yet. The experimental system has had operating problems for the past 3 years. A new waterproof cable and light system is needed to replace the experimental system for long term operation. Slow fill and strobe lights should be operated in tandem to achieve maximum benefits.	H	H
M205	L	not ranked	new	Locks Natural Fishway & Estuary: Construct a more natural, fairly wide and long channel at the Locks facility that would allow both adult and juvenile fish to move back and forth between warmer lake outflow and cooler tidal water, and allow tidal change to inundate areas designed into the channel where both adults and juveniles could find refuge to hold and choose their preferred salinity.		While envisioned for the south side, to replace the function of the existing fish ladder and perhaps some portion of the existing spillway dam, locating a channel somewhat inland on the north side of the Locks may also be a possibility. In principle the project would create a "longer" estuary environment with more mixing. Some design challenges exist, particularly related to mixing as fresh water sits on top of the salt water, and it is difficult to encourage mixing. There may be mechanical means to cool/mix water in the Ship Canal above the Locks. Could also investigate feasibility of artificially cooled water or use of aerators to increase DO levels. There may be a similar project being designed in BC that could serve as a model.	H	L
M206	L	not ranked	new	Improve estuary conditions upstream of locks: Modify the salt water barrier or change operation of the barrier while increasing the number of large lockages to introduce cool marine waters above the locks , and create a longer estuary environment. Project might also be accomplished by moving the salt water drain upstream to the West end of the Fremont Cut.		This is largely an operational change that can be accomplished now but will require using more water and potentially changing the salinity standard at the University Bridge. The area of improvement for water quality is not very large, only extending upstream of the locks a couple of thousand feet. It does not substantially improve the amount of estuary habitat, but maintains a localized, minimum amount available for adult and juvenile chinook in the immediate vicinity of the Locks. It will introduce more salt into the system but cooler temperatures and higher DO is only found in the local area near the Locks, no other benefits are clearly demonstrated for areas upstream. Recreational boat owners in Salmon Bay and vicinity might also be opposed unless they can be convinced that the salt water will be too deep to affect boats. Concerns have been raised about the cost and engineering feasibility of moving the saltwater drain. High ranking assumes a 1-2 degree change in temperature.	H	M/L

M207	L		new	Explore needs/options for "Low Elevation" smolt passage at locks: Project would consider structural options for smolt passage when use of smolt flumes drops off.		This project may not be necessary, as the large locks may be serving this purpose. This should be investigated.	?	L
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Lk Union-Ship Canal Littoral-1: Ballard locks to start of Fremont Cut (Salmon Bay)

Restoration

Project #	Reach #	Reach Restor. Benefit Rank	NTAA #	NTAA Name & Description	Approx. Cost	Notes, Key Uncertainties	Benefits to Chinook H, M, L	Feasib. H, M, L
M208	1	not ranked	new	Ballard Bridge Shoreline Restoration: Potential habitat restoration/public access area under the Ballard Bridge. The potential exists to connect the project with a tiny green space created privately just to the west of site, and the Seattle Central Community College Marine Technology Center's landscaped shoreline to the east.		Groundswell NW has been approached recently by Phillip Riedel, a Ballard architect who has developed proposals for public access and habitat under the Ballard Bridge, on the north side of the Ship Canal crossing. The "Under Ballard Bridge" proposal, in its current seminal form, includes riparian restoration. It also includes a proposal for looking at ways to improve the treatment of rainwater run-off from the Ballard Bridge, which currently is discharged on the surface. Mostly a riparian vegetation project. Possibly also a raised walkway for public access. Water quality problems related to the Ballard Bridge could negate any potential value from the project unless they are addressed (see next project). Nearby industrial businesses may oppose further public access in the area. Groundswell NW is also involved in developing a Greater Salmon Bay Concept Plan to identify other potential sites for restoration opportunities.	L	H/M
M209	1	not ranked	new	Ballard Bridge Water Quality Improvements: Project could be combined with the above project to treat water on site at the proposed vegetation site with bioswales.		Water quality is a major problem, and everything that can be done to address it is important. There may be some mitigation required for the Monorail bridge being constructed in this area. There was some concern expressed about the small scale of this project relative to all the surface area of streets in the area, but it was still perceived as a worthwhile endeavor.	M	M

Lk Union-Ship Canal Littoral-2: Fremont Cut**Restoration**

Project #	Reach #	Reach Restor. Benefit Rank	NTAA #	NTAA Name & Description	Approx. Cost	Notes, Key Uncertainties	Benefits to Chinook H, M, L	Feasib. H, M, L
M210	2	not ranked	Ship Canal 1	Demonstration Project at Fremont Bridge: Work with U.S. Army Corps of Engineers to construct a demonstration project on federal lands West of the Fremont Bridge, where there is an area available for bank re-sloping, addition of native vegetation, and rock removal. Hypothetically, this would provide a refuge site for migrating juveniles.		Current research suggests that fish tend to move about freely through the cut, rather than hugging the edges. There are no predators in the brackish waters of the cut, so survival is nearly 100% for this section. Although the demonstration value of the site might be valuable, it was recommended that restoration efforts be focused East of the Fremont Bridge where fish spend more time and mortality is a more serious concern. There is uncertainty whether restoration efforts in this area could actually increase habitat for predators.	L	M/L

Lk Union-Ship Canal Littoral-9 through 12: Lake Union (Fremont Cut to University Bridge)**Restoration**

Project #	Reach #	Reach Restor. Benefit Rank	NTAA #	NTAA Name & Description	Approx. Cost	Notes, Key Uncertainties	Benefits to Chinook H, M, L	Feasib. H, M, L
M211	9	not ranked	new	99 Bridge Shoreline Restoration: Remove riprap and restore vegetation under the 99 bridge on the north side of the Lake near the Adobe property.		Small site. Thought to be in public ownership.	L	M
M212	9 to 12	not ranked	new	South Wallingford Drainage Improvements: Seattle Public Utilities is working on a plan to address water quality and drainage problems along Northlake Way from Stone Way to I-5. Project may also be combined with several street end revegetation projects. The community is working on a related plan for street improvements.		SPU applied for King County special projects funding. Community received a Neighborhood Matching Grant. Significant community support for project. Benefits of project depend upon the extent of improvements.	M/L	M
M213	10 to 11	not ranked	new	Bank Softening and Revegetation at Gasworks Park: Large area for potential shoreline restoration including bank softening and revegetation.		Concerns about soil contamination at the park may limit feasibility. Therefore revegetation may be more feasible than bank softening. Need to be sure that bank softening projects do not inadvertently create habitat for bass. Lots of public access to the site. Potential to combine project with future contaminant clean-up operations.	M/L	L

M214	9 to 14	not ranked	new	Remove North Lake Union In-Water Structures: Project would remove in-water structures and debris (sunken boats, refrigerators, shopping carts, etc.) to reduce habitat for bass and other predators from the Freemont Cut to the Montlake Cut.		Project may also help reduce toxic leaching from some debris over time. More information on the scope of this project will be available soon from SPU, who is conducting bathymetry studies to map debris. Need to also consider appropriate depth(s) to focus on and also consider potential for contaminated soils in some areas.	M	H/M
M215	12	not ranked	new	7th Ave Street End Park Creation: Pro-Parks Levy project. Potential for shoreline restoration to go along with park establishment.		Project planning has begun. The community advocated that the property be turned into a park since there are so few University District open spaces. The street end is owned by DNR but managed by SDOT. Two community meetings will be scheduled to review possible design scenarios and then build in 2005. As with other street end projects, this is small and is likely to produce only minimal benefits on its own. Should be considered as part of a larger subarea-wide approach.	L	H

Lk Union-Ship Canal Littoral-13 & 14: Portage Bay Restoration

Project #	Reach #	Reach Restor. Benefit Rank	NTAA #	NTAA Name & Description	Approx. Cost	Notes, Key Uncertainties	Benefits to Chinook H, M, L	Feasib. H, M, L
M216	13 & 14	not ranked	new	Explore ways to reduce predation in Portage Bay.		Predation in Portage Bay is not well understood but may be high near the UW hatchery and near the mouth of the Montlake Cut. Further study should be conducted to evaluate the extent of predation in the area. Possible opportunities for reducing predation in the area could include an annual "Bass Derby" fishing event to reduce predator populations in June before Chinook smolt migration.	M	M

Lk Union-Ship Canal Littoral-15: Montlake Cut Restoration

Project #	Reach #	Reach Restor. Benefit Rank	NTAA #	NTAA Name & Description	Approx. Cost	Notes, Key Uncertainties	Benefits to Chinook H, M, L	Feasib. H, M, L
M217	15	not ranked	new	Explore options for deepening the Montlake Cut to allow colder water from Lake Washington to flow in Lake Union.		May be technically difficult. Need to look at thermocline and salinity issues to assess feasibility as well as other possible water quality/hydrodynamic issues. May result in saltwater intrusion into Lake Washington.	?	L